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EVALUATION OF THE PHYSICAL ACTIVITY OF CHILDREN IN GRADES 1-3 ATTENDING THE PRIMARY SCHOOLS IN THE MYŚLENICE POVIAT AND IN THE CITY OF KRAKOW

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Abstract

Objective: To assess the physical activity of children attending grades 1-3 of the primary schools in the region of southern-central Poland (the Małopolska Region).

Methods: The study was conducted in selected primary schools in the years 2009-2012. These included 1,140 students aged 7-9 years, coming from rural areas (658), small towns (284), and one large city (198) - the regional capital: Krakow. The parents of the children completed questionnaires, which included questions pertaining to their children's performance of physical activities at school and outside of school.

Results: Among the 1,140 children studied were 560 (49.1%) boys and 580 (50.9%) girls. Both boys and girls living in Krakow spent the least time (less than one hour a day) in front of a TV or computer screen as compared with the other children. Children living in rural areas would spend 2-3 hours a day on those activities. The largest percentage of children who attended PE classes regularly was from Krakow (100% of the boys and 97.6% of the girls). The case was similar with extracurricular activities that required a lot of exercise - 84.7% of the boys and 85.7% of the girls attended those. Children living in smaller towns were significantly less likely to undertake additional physical activity ($P < 0.05$). Parents of boys were less likely to decide to excuse their children from participation in PE classes than parents of girls ($P < 0.05$).

Conclusions: The place of residence and the gender of the child both have an effect on his or her participation in exercises and recreational activities.

Key words: *children, physical activity, primary school*

Introduction

Over the whole of the evolution process, the human body has been adapted to intense physical activity. Civilisational changes taking place in the modern world led to the minimization of said activity. Lack of adequate exercise can lead to numerous disorders and increased risk of various diseases. Many studies have shown that the main cause of most diseases referred to as civilization diseases or lifestyle diseases is inadequate lifestyle [1]. Proper nutrition, safe food, physical activity, and stress management are the most important factors of healthy human lifestyle. The group of the population particularly vulnerable to the consequences of bad nutrition and inadequate exercise encompasses children entering puberty - a period of intense growth, and at the same time a period of rebellion when young people display a strong need for independence from their environment. It is particularly during the school years that children change their physical activity patterns, adapting to a sedentary lifestyle.

This change is important in relation to health, because physical activity affects the physical and mental development of children and adolescents [2-4]. Studies among children attending the initial grades of the primary school (7-9 years of age) are not particularly frequent - much more research is carried out among older groups [5,6]. Attempts are being made at increasing children's physical activity by introducing, for example, active video games (exergaming) with the use of the gamercize power stepper [5] for the age group 10-11.

The aim of this study was the evaluation of the impact of gender and place of residence of children from southern-central Poland (the Małopolska Region) in grades 1-3 of elementary schools on their physical activity.

Methods

Participants

The study was conducted in the poviat of Myślenice and in the city of Krakow during the years 2009-2012. They included 1,140 primary school aged 7-9 years and their parents. The study was carried out with the consent of the head teachers of the schools, and with the consent of the children's legal guardians, as well as the consent of the children themselves. Children would be eliminated from the study due to the lack of the parents' consent, not because of any restrictions on the number of participants.

The study project have been approved by the Bioethics Committee in Krakow – approval no.: KBET/94/B/2012.

Procedures

The surveys conducted among parents took place with the participation of the head teachers of the schools, who provided assistance in circulating the forms among parents during class meetings or through the pupils themselves.

The parents were informed about the purpose and the method of testing by teachers. The questionnaire for parents included, among others, questions about the socio-economic conditions of the family and the children's physical activity.

Data from the Myślenice Poviat came from the project entitled: "Possibilities of Using Extra-budgetary Resources in Health Promotion and Prevention of Obesity Using the Example of the Myślenice Poviat", co-financed by the EEA Financial Mechanism - a priority 5: "Health and Childcare" and by the Myślenice Starosty [7]. The same research model was applied in Krakow.

Statistical analysis

The results obtained were subjected to statistical analysis and disaggregated by gender and place of residence (rural area, town, and city). For this purpose, all the data were entered into and collated in the Excel 2010 software, and then transposed to the Statistica 9.0 PL package (StatSoft company). In the analysis, nonparametric tests were used, and the level of statistical significance of differences between the compared groups was set at $\alpha = 0.05$.

Results

Socio-economic characteristics of the surveyed families

The data obtained from the survey were characterized by a variable number of responses, because the parents of the children often did not provide answers to all the questions. Therefore, the response rates provided refer to the number of responses provided by parents in relation to specific questions. Among the 1,140 children studied were 560 (49.1%) boys and 580 (50.9%) girls. The average age of the studied children was 8.72 ± 0.79 (6-11 years). There was no difference in age between the group of boys and girls [boys: 8.68 ± 0.81 years of age (5.8-10.2 years); girls: 8.76 ± 0.77 years of age (5.9-10.6 years), $P > 0.05$].

Most mothers declared having completed secondary education (32.0%), then vocational education (29.6%), and elementary education (3.1%). In terms of the type of education, most mothers reported technical education (31.4%) and economics education (29.5%). Most fathers have completed vocational education (44.8%) and secondary education (27.6%); the fewest have completed elementary education (5.1%). Technical education prevailed among the fathers (79.0%). In the studied group, only 15.5% of children were only child; most (nearly half) of the children had at least one brother or sister (Fig. 1). There were usually four people in the studied families (34.9%). Although there also were families consisting of 15 people (0.2%) (Fig. 2).

63.2% of the people in the studied group declared that the economic situation of the family was good. Only 0.1% (one person) assessed their family's economic

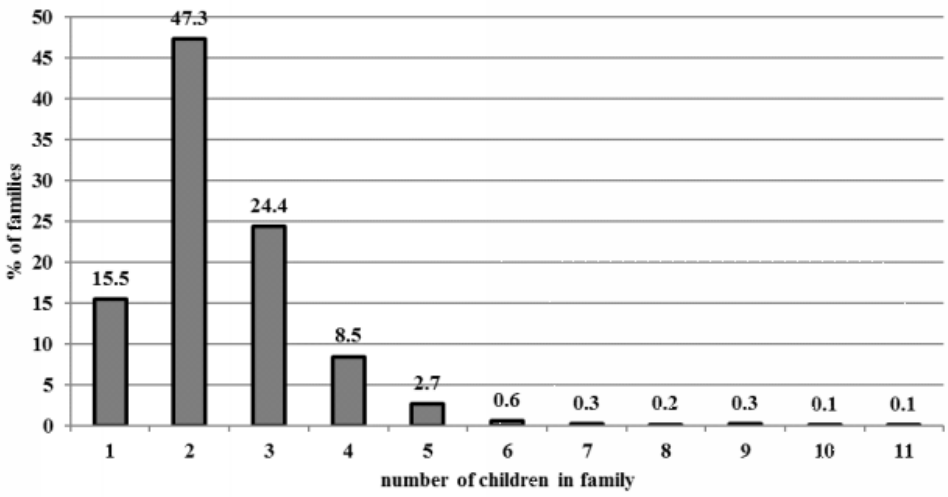

Fig. 1. *Number of children in family (no. of families = 1,136)*

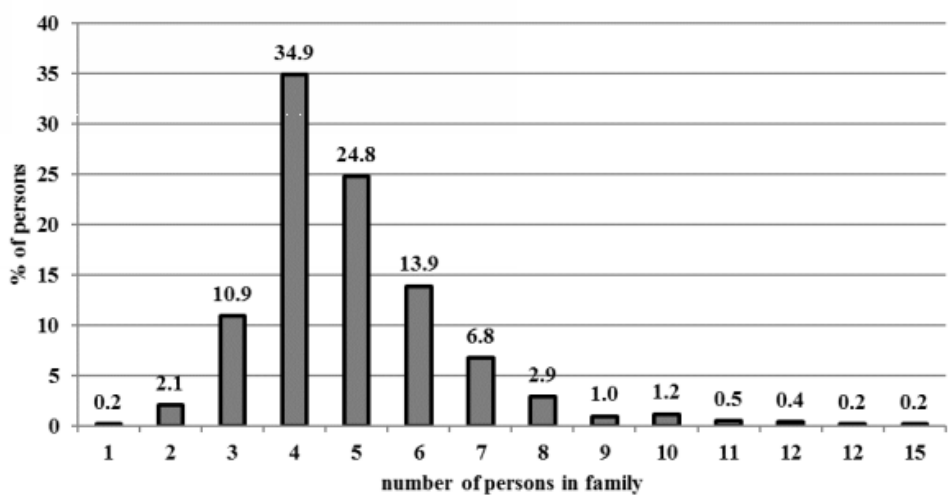

Fig. 2. *Number of family members (no. of families = 1,136)*

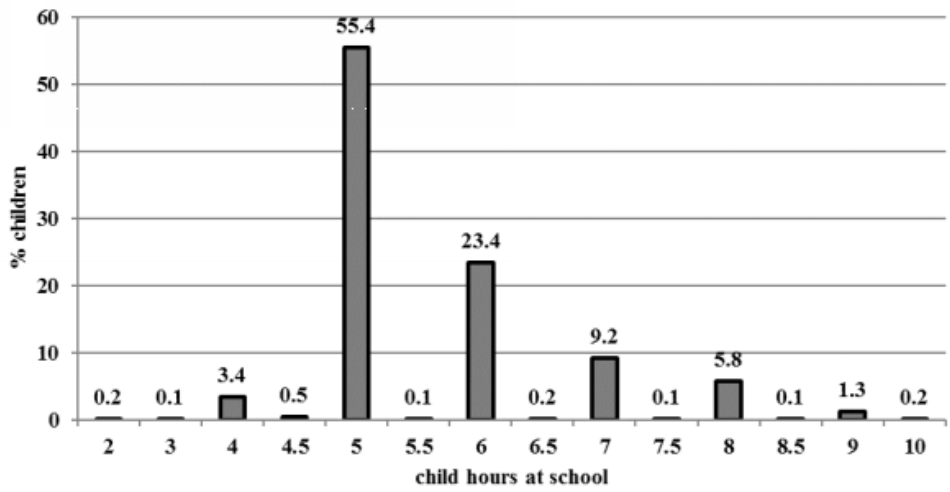

Fig. 3. *Number of hours usually spent by the child at school (number of children = 1,102)*

situation as very bad. In the questionnaire, parents also provided information on the average monthly income of the family. In as many as 21% of the families' monthly income did not reach PLN 1500 (approx. EUR 360); in 48.2% of families the average monthly income ranged between PLN 1500 and 2999 (approx. EUR 360-720). Others (30.8%) reported that their family income exceeded PLN 3,000 (approx. EUR 720).

Children usually stayed at school for five hours (55.4%). One child spent 10 hours at school (0.2%) (Fig. 3).

Gender, place of residence, and undertaking physical activity

In the survey, parents answered questions pertaining to children's physical activity. Table 1 shows the parents' responses, in which they attempted to characterize their children. The answers were split up according to the child's gender. Significant differences between the genders appeared in the responses to the question of excusing children from participation in PE (physical education) classes and the children's participation in additional physical activities ($P < 0.05$). Parents of girls were more likely to excuse them from participation in the classes; girls were also less likely to participate in additional physical activities ($P < 0.05$).

The results of the parents' answering questions related to the physical activity performed by boys and girls, split up depending on the place of residence, is shown in Table 2. Both boys and girls living in Krakow spent significantly less time (less than one hour a day) in front of a TV or a computer - 64.2% of the boys and 63.4% of the girls ($P < 0.05$). In contrast, the girls and boys who live in the countryside would spend the most time (2-3 hours a day) in front of a TV or a computer (53.2% of the boys, 51.9% of the girls). The differences found among both boys and girls, depending on where they lived, were significantly different in terms of time devoted to activities involving the TV and the computer ($P < 0.05$).

Children living in both rural and urban areas enjoyed PE classes, regardless of the place of residence ($P > 0.05$). From 95.3% to 100% of the boys and girls would attend PE classes regularly. No differences that depended on the place of residence were found in that respect between boys and girls ($P > 0.05$).

Table 1. *Features of physical activity performed by boys and girls*

Parameter	Reply	Overall N (%)	Boys N (%)	Girls N (%)	Chi-squared test * or Mann-Whitney U test **P
Time spent in front of TV or computer	Up to 1 hour	519 (47.8)	256 (48.4)	263 (47.2)	0.6922 *
	2-3 hours	516 (47.4)	250 (47.1)	266 (47.8)	
	More than 3 hours	51 (4.8)	23 (4.5)	28 (5.0)	
Physical education classes are popular	No	7 (0.6)	5 (0.9)	2 (0.4)	0.7472 *
	Not really	25 (2.3)	9 (1.7)	16 (2.9)	
	I think so	99 (9.1)	54 (10.1)	45 (8.2)	
	Yes	955 (88)	463 (87.3)	492 (88.6)	
Participation in physical education classes	Regular	1060 (96.8)	518 (96.5)	542 (97.2)	0.5360 **
	Irregular	35 (3.2)	19 (3.5)	16 (2.8)	
Excusing the child from participation in physical education classes by the parent	Never	1018 (93.6)	510 (95.7)	508 (91.7)	0.0168 *
	Sometimes	67 (6.2)	22 (4.1)	45 (8.1)	
	Yes	2 (0.2)	1 (0.2)	1 (0.2)	
The child participates in additional physical activities	No	445 (40.8)	201 (37.4)	244 (44.0)	0.0235 **
	Yes	641 (59.2)	331 (62.6)	310 (56.0)	
Regularity of additional physical activities	Regularly	410 (67.6)	215 (66.8)	195 (68.4)	0.6213 **
	Casually	196 (32.4)	106 (33.2)	90 (31.6)	

N – number of children, *P* – level of statistical significance

Table 2. *Physical activity performed by the studied groups of children depending on the place of residence*

Parameter	Reply	O	Rural area			Town			Krakow			The Kruskal-Wallis ANOVA test *P*
			O	B	G	O	B	G	O	B	G	
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
Time spent in front of TV or computer	Up to 1 hour	519 (47.8)	268 (42.4)	124 (42.4)	144 (42.5)	129 (49.0)	62 (48.8)	67 (49.3)	122 (63.9)	70 (64.2)	52 (63.4)	B: 0.0007 G: 0.0019
	2-3 hours	516 (47.4)	332 (52.5)	156 (53.2)	176 (51.9)	119 (45.3)	58 (45.7)	61 (44.8)	65 (34.0)	36 (33.0)	29 (35.4)	
	More than 3 hours	51 (4.8)	32 (5.1)	13 (4.4)	19 (5.6)	15 (5.7)	7 (5.5)	8 (5.9)	4 (2.1)	3 (2.8)	1 (1.2)	
Physical education classes are popular	No	7 (0.6)	6 (1.0)	4 (1.4)	2 (0.6)	1 (0.4)	1 (0.8)	0 (0)	0 (0)	0 (0)	0 (0)	B: 0.1452 G: 0.1124
	Not really	25 (2.3)	14 (2.2)	6 (2.1)	8 (2.4)	8 (3.0)	2 (1.6)	6 (4.4)	3 (1.6)	1 (0.9)	2 (2.4)	
	I think so	99 (9.1)	47 (7.5)	26 (8.9)	21 (6.3)	25 (9.4)	9 (7.0)	16 (11.7)	27 (14.0)	19 (17.3)	8 (9.6)	
	Yes	955 (88)	560 (89.3)	256 (87.6)	304 (90.7)	232 (87.2)	117 (90.6)	115 (83.9)	163 (84.4)	90 (81.8)	73 (88)	
Participation in physical education classes	Irregular	35 (3.2)	25 (3.9)	14 (4.7)	11 (3.2)	8 (3.0)	5 (3.9)	3 (2.2)	2 (1.0)	0 (0)	2 (2.4)	B: 0.0704 G: 0.8002
	Regular	1060 (96.8)	611 (96.1)	283 (95.3)	328 (96.8)	256 (97)	124 (96.1)	132 (97.8)	193 (99)	111 (100.0)	82 (97.6)	
Excusing the child from participation in physical education classes by the parent	Never	1018 (93.6)	582 (92.2)	275 (93.9)	307 (91.1)	251 (95.1)	127 (98.4)	124 (91.9)	185 (96.4)	108 (97.3)	77 (95.1)	B: 0.0674 G: 0.4598
	Sometimes	67 (6.2)	48 (7.6)	18 (6.1)	30 (8.9)	13 (4.9)	2 (1.6)	11 (8.1)	6 (3.1)	2 (1.8)	4 (4.9)	
	Yes	2 (0.2)	1 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.5)	1 (0.9)	0 (0)	
The child participates in additional physical activities	No	445 (40.8)	325 (52)	138 (47.4)	187 (56.0)	91 (34.2)	46 (35.4)	45 (33.1)	29 (14.9)	17 (15.3)	12 (14.3)	B: <0.0001 G: <0.0001
	Yes	641 (59.2)	300 (48.0)	153 (52.6)	147 (44.0)	175 (65.8)	84 (64.6)	91 (66.9)	166 (85.1)	94 (84.7)	72 (85.7)	
Regularity of participation in additional physical activities	Regularly	410 (67.6)	145 (52.7)	76 (53.1)	69 (52.3)	129 (76.8)	62 (73.8)	67 (79.8)	136 (83.4)	77 (81.9)	59 (85.5)	B: <0.0001 G: <0.0001
	Casually	196 (32.4)	130 (47.3)	67 (46.9)	63 (47.7)	39 (23.2)	22 (26.2)	17 (20.2)	27 (16.6)	17 (18.1)	10 (14.5)	

O – overall, B – boys, G – girls, *P* – level of significance

Children attended additional activities that required a lot of exercise the most numerously were from Krakow (84.7% of the boys and 85.7% of the girls), and the least numerously by children from rural areas - 52.6% of the boys and 44% of the girls ($P < 0.05$). Parents of children living in towns reported that 64.6% of their sons and 66.9% of their daughters attended such activities, which places those results in the middle. Significantly more boys (62.6%) have chosen extracurricular physical activities as compared to girls (55.9%) ($P < 0.05$).

Extracurricular physical activities were also attended most frequently by children living in Krakow (83.4% of the children) as compared to towns (76.8% of children), and rural areas (52.7% of the children) ($P < 0.05$). There were no gender differences between boys and girls in terms of regular participation in such extracurricular activities ($P > 0.05$).

Discussion

The consequence of low physical activity and poor diet is the increasing problem of excessive weight gain and obesity among children. According to a report by the IOTF, about 20% of children in Europe are overweight [8].

In the United States, more than 80% of teenagers do not comply with physical activity guidelines. The lack of physical activity undoubtedly contributes to the increase in the extent of obesity among children and adolescents. Taking regular exercise reduces body fat, increases the efficiency of the circulatory system and muscular strength. It improves bone health and has many cognitive and psychosocial benefits. Establishing good eating habits at an early stage and improving physical activity promotes better health and reduces body fat [9,10].

According to Woynarowska and Mazur, 38% of boys and 56% of girls spend only one hour a week for intense exercise [11]. The report prepared by the Office of the Government Plenipotentiary for Women and Families states that only every sixth student knows what is healthy for them. Over half of the girl students and every third boy student spend less than one hour a week on exercise and physical activities; 67% of girls and 79% of boys spend at least two hours in front of the TV screen every day [3].

Also, according to the research of Jodkowska et al., the average total time spent by teenagers on watching television and using the computer on school days is about 4 hours a day, and 6 hours a day at weekends [4]. The authors' own studies show that 47.8% of children spend up to 1 hour a day in front of the TV and computer screen, and nearly twice as many (47.4%) devote from 2 to 3 hours a day to that activity.

Only a small percentage of children and adolescents meet the current recommendations to spend at least 60 minutes a day on moderate to intense exercise. It is assumed that a good level of physical activity at a young age and active lifestyle in childhood makes it easy to maintain adequate physical activity in adulthood. Insufficient physical activity is associated with an increased risk of obesity and metabolic diseases in addition to cardiovascular diseases [12].

A study conducted in south-western Germany among school-aged children found that more than half of them led a sedentary lifestyle, and less than half of these children met the current recommendations of a minimum of 60 minutes a day of moderate physical activity [12,13].

Studies conducted in 42 primary and secondary schools in the city of Sherbrooke, Canada, in 2013 showed that about 41% of children met the minimum of 60 minutes of moderate to intense exercise a day. Generally speaking, almost half of the boys (49%) and about one third of the girls (34%) were active physically for at least 60 minutes each day. This percentage, however, decreased during adolescence, especially among girls [14].

The Polish Ombudsman and the Food and Nutrition Institute in cooperation with the Children's Memorial Health Institute drafted the Charter of Nutrition and Physical Activity for Children and Adolescents at School. They believe that it is important to introduce weight control, and to monitor the physical fitness of children; due to the fact that the report on the effects of implementation of the National Health Programme in 2004 shows that the level of physical fitness of children and adolescents in Poland is systematically deteriorating. Only slightly more than 30% of children take part in organized sports activities in addition to their regular PE classes [15].

Our own research showed that all children - living in both rural and urban areas - enjoyed and attended physical education classes. 96.5% of the boys and 97.2% of the girls regularly attended the classes.

The results of the research in Poland indicate a very low level of physical activity among the majority of Poles, 68% of young people spend their free time in a passive way (for example: watching TV, using the computer, or reading) [16]. In today's world an extremely fast pace of life is accompanied by the elimination of exercise and a decline in physical activity. There are many reasons for people's low level of physical activity. Among adolescents, one such reason is the development of information and communication technology, particularly computers and the Internet. They are attractive to young people and competitive in relation to physical activity [18].

Physical activity brings health benefits when practiced regularly throughout the majority of the week. In the case of children and young people whose physical activity is very low, exercise should be introduced gradually. It should start with shorter sessions, 2-3 times a week, and then gradually increase in frequency [17,18].

Conclusions

The gender of the child influences the participation of girls in physical activities; girls were more often excused from participation in PE classes and were less likely to participate in additional physical activities as compared with boys.

The place of residence of the child has an effect on his or her participation in exercises and recreational activities. Children living in rural areas spend more time watching television or using the computer than on recreation and exercise as compared to children living in Krakow.

Declaration of interest

The authors report no conflicts of interest.

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A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection